# TAC MicroNet 2000
## MN-FLO Series VAV Controllers

- Integrated packaging offers actuator, pressure transducer, and controller.
- Digital wall sensor displays room and network shared values.
- Patented pressure transducer provides years of reliable, accurate air flow readings.
- Proportional and proportional integral control for cooling and heating.
- Integral actuator offers manual override and travel limit settings for easy set up and support.
- Advanced two-wire communications is topology and wire type independent.
- Plenum rated enclosure allows direct mounting in plenum.
- Automated air balancing using the TAC MicroNet VAV Air Balance software.
- Proven proportional plus integral control of pressure independent VAV boxes.
- Diagnostic reporting:
  Controller memory.
  Flow sensor verification.
  Temperature sensor verification.
  Negative air flow detection.
  Proper communications.
- Operating values reporting to BAS for reports, trends, and monitoring.
- Centralized setpoint, mode, and override commands from BAS for comfort and energy management.

As a member of the TAC MicroNet 2000™ family of Direct Digital Controls for Variable Air Volume (VAV) terminal boxes, the TAC MicroNet VAV Controllers offer an integral actuator (with manual override) and an integral patented pressure transducer. There are two models available, one with digital outputs and one without. Both models provide programmability to accommodate a wide range of applications. Interfacing and programming of the TAC MicroNet VAV Controller are accomplished through the TAC MicroNet line of digital wall sensors, or the TAC MicroNet Controller Interface software.

### APPLICATIONS

Designed to meet the tough control strategies of today's VAV systems, the TAC MicroNet VAV Controller may be applied to new or existing pressure independent terminal boxes with or without reheat capabilities.

### SYSTEMS CONNECTIVITY

Communications is optimized throughout the system to provide immediate feedback for the facility operator. The TAC MicroNet 2000 offers the advantages of stand-alone and networked control. The economic packaging and simple wiring allow existing pneumatic VAV systems to be fully retrofitted with a TAC MicroNet VAV control system. The built-in actuator allows quick and effective mounting directly over the damper shaft of the terminal box.

The digital wall sensor is durable and offers easy monitoring, including a wide variety of interface capabilities for the user. Using the digital wall sensor, the operator can monitor the performance of the product, edit operational values, and even reprogram the controller, if provided the proper password level. Through the wall sensor access jack, the TAC MicroNet Controller Interface software may be utilized to automate the balancing of the VAV terminal box.

### MODEL CHART

| Model | Digital Outputs | Control Strategies | |
|---|---|---|---|
| | | VAV Box Configuration | Reheat Type |
| MN-FLO | 0 | Cooling only | None |
| MN-FLO3T | 3 (Triac) | Cooling, series, or parallel fan | None, staged, electric, floating hydronic, occupancy, or satellite control |

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## Communications

**Building Automation System (BAS)**

**TAC I/A Series®**

Via the MN-ASDI TAC MicroNet Integrator for the ASD Bus.

**TAC MicroNet U-Bus™**

1000 ft (305 m) between TAC MicroNet Integrator and most distant TAC MicroNet Controller. 3000 ft (914 m) total distance, including all wire segments. Multiple U-Bus cable end of lines are allowable and termination resistors are not required.

**TAC MicroNet U-Link™**

200 ft (61 m) between controller and the controlled devices or peripherals. 400 ft (122 m) total distance including all wire segments.

**TAC MicroNet Controller Interface**

The TAC MicroNet Controller Interface software is installed on a DOS-based personal computer (PC) which allows communication with all MN-FLOs and MN-FLO3Ts and the TAC MicroNet Integrator on a common U-Bus. Permits reconfiguration, monitoring, air balance, and editing of all TAC MicroNet Controller configuration data via the TAC MicroNet Controller Interface Module (MN-CIM) which interfaces between the RS-232 port of a PC and the TAC MicroNet Sensor's communication interface jack.

## TAC MicroNet VAV Air Balance Software

The TAC MicroNet Air Balance software, MNA-FLO-2, is installed on a DOS-based PC and communicates to a TAC MicroNet VAV Controller being air balanced. This automated program steps through the required process of air balancing. It requests user input at the appropriate stages, performs all calculations in the background, and drastically iproves the efficiency of balancing VAV terminal boxes. The TAC MicroNet VAV Air Balance software features:

- User friendly displays and menus.
- Operation in English and metric units
- Ability to check actuator rotation and linkage and to automatically adjust rotation as needed.
- Ability to adjust the flow calibration constants, fan speed, reheat min flow, and parallel fan setpoint.
- Detailed on-line help for using various commands and suggesting possible fixes for error conditions.
- Automatic logging of important balance values such as min, max, and reheat min flow, calibration values, parallel fan SP, actuator rotation direction, box number, and time/date.
- Automatically totals flow from multiple discharges.

## Accessories

| Part Number | Description |
|---|---|
| AM-135 | 3/8" (9.5 mm) to 1/2" (12.75 mm) shaft adapter |
| MN-CI | TAC MicroNet Controller Interface software for commissioning, monitoring, trending, and editing of TAC MicroNet VAV Controllers |
| MN-CIM. | TAC MicroNet Controller Interface Module for use with the TAC MicroNet Controller Interface and the TAC MicroNet VAV Air Balance software. Connects the PC to the jack on the TAC MicroNet Sensor which allows communication with the TAC MicroNet VAV Controller |
| MN-S Series | TAC MicroNet Digital Wall Sensors |
| MN-SDT | TAC MicroNet Duct/Immersion Sensor |
| MNA-FLO-1 | TAC MicroNet VAV Enclosure for conduit applications |
| MNA-FLO-2 | TAC MicroNet VAV Air Balance software for automated air balancing of TAC MicroNet VAV Controllers |
| PC-301 | Air flow switch for electric reheat interlock |

# SPECIFICATIONS
## MN-FLO, MN-FLO3T

### HARDWARE SPECIFICATIONS

**Dimensions**
7-3/4 in. H x 6-1/4 in. W x 2-1/2 in. D (197 mm x 159 mm x 63 mm).

**Enclosure**
Conforms to NEMA-1 requirements. Meets UL94-5V flammability for plenum application use.

**Conduit Knockouts**
Not applicable. Order optional TAC MicroNet Enclosure, MNA-FLO-1, if wiring to flexible conduit is desired.

**Power Supply Input**
24 Vac±15%, 50/60 Hz.

**Maximum Power Consumption**
5 VA for MN-FLO. 5 VA plus DO loads (41 VA max. at 24 Vac) for MN-FLO3T.

**Surge Immunity Compliance**
IEC 801.5 and ANSI C62.41 (IEEE-587, Category A & B).

**Transient Compliance**
IEC 801.4.

**Electrostatic Discharge Compliance**
IEC 801.2.

### AGENCY APPROVALS

**UL-916**
File # E71385 Category PAZX.

**CSA**
File #LR 3728.

**FCC**
Class A.

**UL-864**
File #S5381 Category UUKL.

### AMBIENT LIMITS

**Operating Temperature**
32 to 131 °F (0 to 55 °C).

**Shipping and Storage Temperature**
-40 to 160 °F (-40 to 71 °C).

**Humidity**
5 to 95% RH, non-condensing.

**Wiring Terminals**
Screw terminals

Power: AWG #14 to #24.

DOs: AWG #14 to #24.

Communication: AWG #18 to #24.

### VELOCITY PRESSURE INPUT

**Operating Range**
0.0 to 2.00 in. of W.C. (0.0 to 0.497 kPa).

**Control Range**
0.05 to 2.00 in. of W.C. (0.0125 to 0.498 kPa).

**Accuracy**
± 5% at 1.00 in. of W.C. (0.249 kPa) with Laminar flow at 77 °F (25 °C).

**Sensor Type**
Self-calibrating flow sensor (differential pressure).

**Indication**
Negative velocity pressure indication provided.

**Tubing Connection**
Barb fittings for 0.170 in. I.D. FRPE polyethylene tubing or 1/4 in. O.D./0.125 in. I.D. tygon tubing (high and low pressure taps).

**Tubing Length**
5 ft (1.52 m) maximum each tube.

### INPUTS (FROM TAC MICRONET SENSOR)

**Space Temperature**
32 to 122 °F (0 to 50 °C).

**Duct Temperature**
-40 to 250 °F (-40 to 121 °C).

**Setpoints**
40 to 95 °F (4.4 to 35 °C).

**Override Pushbutton (optional)**
For stand-alone occupancy control or remote status monitoring of local status condition. Field programmable override timing 60 minutes (default).

### ACTUATOR OUTPUTS

**Torque Rating**
53 lb-in. (6 N-m).

**Stroke**
Fully adjustable from 0° to 90°.

**Timing**
Approximately 3 minutes at 60 Hz (3.6 minutes at 50 Hz) for 90° rotation at 24 Vac.

**Position Indication**
Provides a visual indication of position.

**Manual Override**
Pushbutton to allow manual positioning of the damper.

**Damper Linkage**
1/2 in. (12.75 mm) or 3/8 in. (9.5 mm) diameter round shaft extending 7/8 in. (22.23 mm) minimum from terminal box. 3/8 in. (9.5 mm) diameter shaft requires AM-135 adapter kit.

### DIGITAL OUTPUTS (MN-FLO3T)

Quantity: 3.

**Current Ratings:**
DO1 and DO2: 24 VA total (DO1 + DO2) load at 24 Vac, 50/60 Hz.

DO3: 12 VA at 24 Vac, 50/60 Hz.

### PERSONAL COMPUTER CONFIGURATION REQUIREMENTS

**Type**
IBM® compatible, desktop or portable.

**Processor**
80286 or higher.

**RAM**
512K.

**Disk Drives**
3-1/2 in. high density floppy. Hard disk recommended, but not required.

**Operating System**
MS-DOS® 3.3 or higher.

**Ports**
RS-232 serial port (COM1 OR COM2)

**Monitor**
CGA, EGA, MCGA, and VGA monochrome or color.

**Port Adapter**
TAC MicroNet Controller Interface Module (MN-CIM).

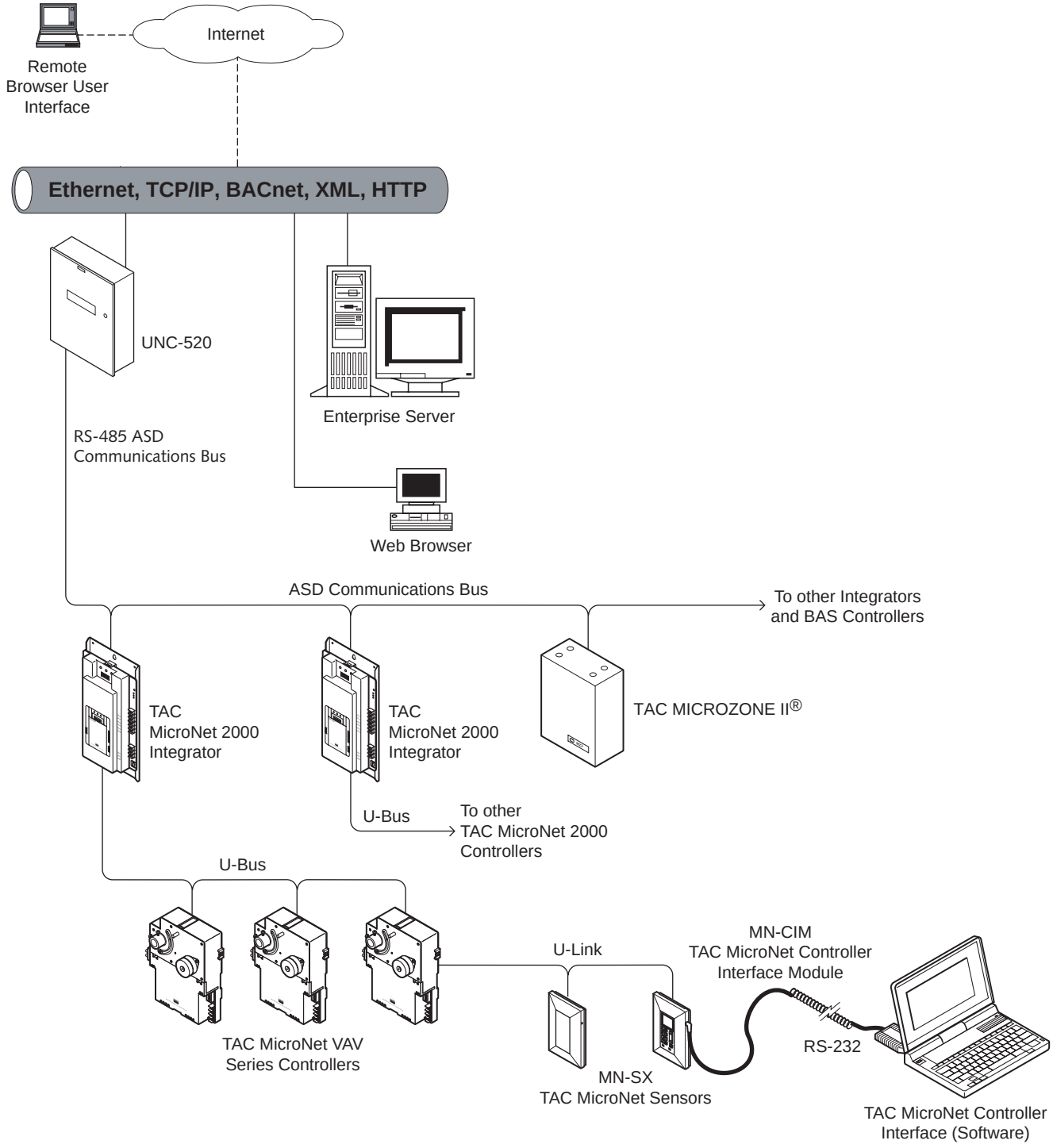


Figure 1 Terminal Connections and Performance Indicators.

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